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FACT SHEET

KENTUCKY POLLUTANT DISCHARGE ELIMINATION SYSTEM
PERMIT TO DISCHARGE TREATED WASTEWATER
INTO WATERS OF THE COMMONWEALTH

PERMIT No.: KY0041971 **Permit Writer:** Sara J. Beard **Date:** August 4, 2009
AI No.: 4054

1. **SYNOPSIS OF APPLICATION**

a. Name and Address of Applicant

Louisville Gas & Electric Company
P.O. Box 32010
Louisville, Kentucky 40232

b. Facility Location

Louisville Gas & Electric Company
Trimble County Generating Station
487 Corn Creek Road
Bedford, Trimble County, Kentucky

c. Description of Applicant's Operation

Coal-fired steam electric generation and transmission facility (SIC Code 4911).

d. Production Capacity of Facility

Unit 1 – 566 MW (began operation 1989)
Unit 2 – 750 MW (under construction and scheduled for operation in 2010)

e. Description of Existing Pollution Abatement Facilities

Outfall 001 - Sedimentation of storm water from plant roof drains, gas turbine evaporative cooler blowdown, gas turbine blade washings and various plant yard areas.

Outfall 002 - Combined untreated cooling tower blowdown from Units 1 and 2 and internal outfall 006. This wastewater is discharged through a multi-port diffuser. Cooling water is periodically brominated to control bio-fouling of condensers.

1. **SYNOPSIS OF APPLICATION - continued**

e. Description of Existing Pollution Abatement Facilities - continued

Outfall 003 - Sanitary wastewater is treated in an activated sludge, aerobic digestion, and chlorination system prior to discharge to the Combined Bottom and Fly Ash Treatment Basin (BAP). The BAP is operated as a no discharge system.

Outfall 004 - Chemical precipitation and neutralization are provided to the metal cleaning wastewater prior to discharge to the BAP. The BAP is operated as a no discharge system.

Outfall 005 - Plant intake.

Outfall 006 - This outfall previously received untreated uncontaminated stormwater runoff from wooded hillside northeast of plant. This is being removed from the permit. Outfall 006 will now be the internal outfall to 002 that receives excess process waters from the Gypsum Storage Basin, coal/limestone runoff, low volume wastes, and stormwater runoff into the basin.

Outfall 007 - No treatment of uncontaminated stormwater runoff from wooded hillside east of plant and aesthetic berm south of plant. This outfall is being removed from the permit.

Outfall 008 - Sedimentation of stormwater runoff from borrow pit used to contain silt dredged from the Ohio River. This outfall is being removed from the permit.

Outfall 009 - No treatment of uncontaminated storm water runoff from southwest plant yard and aesthetic berm. This outfall is being removed from the permit.

f. Permitting Action

Reissuance of a major KPDES permit for a new source coal-fired steam electric generation facility.

2. **RECEIVING WATERS**

a. Receiving Water Name

Outfalls 001 and 002 discharge to the Ohio River at mile points 409.5 and 409.7, respectively.

Outfalls 003 and 004 discharge to the ash pond, which is operated as a no discharge system.

Outfall 005 is the plant intake from the Ohio River.

Stormwater outfalls 006, 007, 008, and 009 are being removed from the permit.

Outfall 006 will now be the internal outfall to 002 that receives excess process waters from the Gypsum Storage Basin, coal/limestone runoff, low volume wastes, and stormwater runoff into the basin.

2. **RECEIVING WATERS - continued**

b. Stream Segment Use Classifications

The Ohio River is classified as Warmwater Aquatic Habitat, Primary Contact Recreation, Secondary Contact Recreation, and Domestic Water Supply.

c. Stream Segment Antidegradation Categorization

This segment of the Ohio River is listed as Impaired on the 2008 303(d) List of Waters For Kentucky. Impairments include partial support of fish consumption. The pollutants of concern are Dioxins (including 2,3,7,8-TCDD) and Polychlorinated Biphenyls. Suspected sources are unknown. A review of the application submitted for the reissuance of this permit did not reveal the presence of Dioxins or PCBs in any of the discharges.

d. Stream Low Flow Condition

At the point of discharge, the 7Q10 and the Harmonic Mean for the Ohio River are 13,000 and 57,347 cfs, respectively.

At the Oldham County Water District intake, at the nearest downstream public water supply, the 7Q10 and the Harmonic Mean for the Ohio River are 13,000 and 57,355 cfs, respectively.

3. REPORTED DISCHARGE AND PROPOSED LIMITS

Description of Discharge - Outfall 001 – Sedimentation of storm water from plant roof drains, gas turbine evaporative cooler blowdown, gas turbine blade washings and various plant yard areas.

Effluent Characteristics	Reported Discharge		Proposed Limits		Applicable Water Quality Criteria and/or Effluent Guidelines
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	
Flow (MGD)	7.61	7.69	Report	Report	401 KAR 5:065, Section 2(8)
Total Suspended Solids (mg/l)	14.9	15.2	30	50	401 KAR 5:080, Section 1(2)(c)2
Oil & Grease (mg/l)	BDL	BDL	10	15	401 KAR 5:080, Section 1(2)(c)2
Hardness (as mg/l CaO_3)	377	377	Report	Report	401 KAR 5:065, Section 2(8)
Total Recoverable Metals (mg/l)	0.12	0.12	Report	Report	401 KAR 5:065, Section 2(8)
pH (standard units)	6.7	8.9	6.0 (min)	9.0 (max)	401 KAR 10:031, Section 4

The data contained under the Reported Discharge columns are not from the renewal application, but rather from the analysis of the DMR data that has been reported during the term of the current permit.

The abbreviation BDL means Below Detection Limit.

The term Total Recoverable Metals means those metals listed on Form C, Section V, Part C – Metals, Cyanide, and Total Phenols: Antimony, Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc.

4. METHODOLOGY USED IN DETERMINING LIMITATIONS

a. Serial Number

Outfall 001 – Sedimentation of storm water from plant roof drains, gas turbine evaporative cooler blowdown, gas turbine blade washings and various plant yard areas.

b. Effluent Characteristics

Flow	Total Suspended Solids	Oil & Grease
Hardness	Total Recoverable Metals	pH

c. Pertinent Factors

On September 8, 2004 Kentucky's revised water quality standards, 401 KAR 10:031 became effective.

d. Monitoring Requirements

The flow shall be monitored instantaneously once per quarter.

Total Suspended Solids, Oil & Grease, Hardness, and pH shall be monitored once per quarter by grab sample.

Total Recoverable Metals shall be monitored once per quarter by grab sample. The results of the analyses shall be totaled and reported as a single concentration on the Discharge Monitoring Report (DMR). The laboratory bench sheets showing the results for each metal shall be attached to the DMR.

e. Justification of Limits

The Kentucky Administrative Regulations (KARs) cited below have been duly promulgated pursuant to the requirements of Chapter 224 of the Kentucky Revised Statutes (KRSs).

Flow, Hardness, and Total Recoverable Metals
The monitoring requirements for these parameters are consistent with the requirements of 401 KAR 5:065, Section 2(8).

Total Suspended Solids and Oil & Grease
The limits for these parameters are consistent with the requirements of 401 KAR 5:080, Section 1(2)(c)2. These limits are representative of the Division of Water's "Best Professional Judgment" (BPJ) determination of the "Best Conventional Pollutant Control Technology" (BCT) requirements for this pollutant.

pH
The limits for this parameter are consistent with the requirements of 401 KAR 10:031, Section 4.

5. REPORTED DISCHARGE AND PROPOSED LIMITS

Description of Discharge - Outfall 002 – Combined untreated cooling tower blowdown from Unit 1 and Unit 2, and excess waters from the Gypsum Storage Basin (Tier 2: Internal Outfall 006). This wastewater is discharged through a multi-port diffuser. Cooling water is periodically brominated to control bio-fouling of condensers.

Effluent Characteristics	Reported Discharge Monthly Average	Reported Discharge Daily Maximum	Proposed Limits Monthly Average	Proposed Limits Daily Maximum	Applicable Water Quality Criteria and/or Effluent Guidelines
Flow (MGD)	1.55	3.44	Report	Report	401 KAR 5:065, Section 2(8)
Temperature (^{o}F)	24.9 (^{o}C)	29.2 (^{o}C)	95	100	401 KAR 10:031, Section 4 401 KAR 5:080, Section 1(2)(c)2 401 KAR 10:029, Section 4
Free Available Chlorine (mg/l)	D/C	D/C	0.2	0.5	401 KAR 5:065, Sections 4 and 5
Time of Chlorine Addition (minutes/unit/day)	D/C	D/C	N/A	120	401 KAR 5:065, Sections 4 and 5
Time of Oxidant Addition (minutes/unit/day)	N/R	200	N/A	120	401 KAR 5:080, Section 1(2)(c)2 401 KAR 5:065, Sections 4 and 5
Total Residual Chlorine (mg/l)	D/C	D/C	Removing from Permit		401 KAR 5:080, Section 1(2)(c)2
Total Residual Oxidants (mg/l)	N/R	N/R	Report	0.20	401 KAR 5:080, Section 1(2)(c)2
Total Chromium (mg/l)	0.0056	0.0056	0.2	0.2	401 KAR 5:065, Sections 4 and 5
Total Zinc (mg/l)	0.063	0.063	1.0	1.0	401 KAR 5:065, Sections 4 and 5
Priority Pollutants* (mg/l)	N/R	N/R	N/A	NDA	401 KAR 5:065, Sections 4 and 5
Chloride (mg/l)	N/R	N/R			
Tier 1			N/A	N/A	
Tier 2			Report	Report	401 KAR 5:065, Section 2(8) 401 KAR 10:031, Section 6
pH (Standard Units)	7.4	8.8	6.0 min	9.0 max	401 KAR 10:031, Section 4

5. REPORTED DISCHARGE AND PROPOSED LIMITS - continued

The data contained under the Reported Discharge columns are not from the renewal application, but rather from the analysis of the DMR data that has been reported during the term of the current permit.

The abbreviation D/C means Does Not Chlorinate.

The abbreviation N/A means Not Applicable.

The abbreviation NDA means No Detectable Amount.

Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any one time.

The term Priority Pollutants means the 126 priority pollutants listed in 40 CFR Part 423 Appendix A. See Fact Sheet Attachment A – Regulatory Requirements.

* Compliance with the limitations for the 126 priority pollutants may be determined by engineering calculations which demonstrate that the regulated pollutants are not detectable in the final discharge by the analytical methods in 40 CFR part 136. Sampling of cooling tower blowdown must be taken at the nearest accessible point prior to discharge to or mixing with the receiving waters or wastestreams from other outfalls.

Tier 1: Limits are for current operations of Unit 1 as well as the addition of Unit 2 (scheduled to begin operation in 2010).

Tier 2: Limits are applicable after the Gypsum Storage Basin is complete. Discharge will consist of cooling tower blowdown from Units 1 and 2 as well as excess process waters from the Gypsum Storage Basin (Internal Outfall 006), coal/limestone runoff, low volume wastes, and stormwater runoff into the basin.

6. METHODOLOGY USED IN DETERMINING LIMITATIONS

a. Serial Number

Outfall 002 – Combined untreated cooling tower blowdown from Unit 1 and Unit 2, and excess waters from the Gypsum Storage Basin (Tier 2: Internal Outfall 006). This wastewater is discharged through a multi-port diffuser. Cooling water is periodically brominated to control bio-fouling of condensers.

b. Effluent Characteristics

Flow	Temperature	Free Available Chlorine
Total Residual Oxidants	Total Residual Chlorine	
Time of Oxidant Addition	Total Chromium	Time of Chlorine Addition
Total Zinc	Priority Pollutants	Chloride
pH		

c. Pertinent Factors

On September 8, 2004 Kentucky's revised water quality standards, 401 KAR 10:031 became effective.

Units 1 and 2 are subject to the requirements of 40 CFR Part 423 - Steam Electric Power Generating Point Source Category. Both Units are new sources (Unit 2 scheduled for startup in 2010). The specific requirements for both units include the "Best Available Technology Economically Achievable" (BAT – 423.13) and "New Source Performance Standards" (NSPS – 423.15).

Louisville Gas & Electric Company – Trimble County Station requested mixing zones for Temperature and Chloride in the vicinity of the proposed discharge.

After review of the multi-port diffuser information submitted by the permittee and consideration of the relatively small effluent flow rate (10.18 MGD reported maximum) as compared to the receiving water flow rate (7Q10 of 8,402 MGD) (0.12%), the Division of Water has determined that a mixing zone will be granted for Temperature.

The Division currently has insufficient information about Chloride levels in the effluent to perform a reasonable potential analysis and determine the physical dimensions of a mixing zone for this parameter. Tier 2 requires the permittee to sample for Chloride thereby providing the Division with the data necessary to analyze the discharge.

A summarization of the water quality standards and thermal mixing zone model can be found in Fact Sheet Attachment A – Steady State Toxics Wasteload Allocation Model (SSTWAM2004) and Fact Sheet Attachment B - CORMIX Diffuser Model – Thermal, respectively.

6. METHODOLOGY USED IN DETERMINING LIMITATIONS - continued

d. Monitoring Requirements

Flow shall be continuously calculated as the summation of all contributing flows.

Temperature shall be measured continuously by recorder.

Total Residual Oxidants and Free Available Chlorine shall be sampled by multiple grabs during periods of oxidation, but no more frequently than once per week. Multiple grabs shall consist of grab samples collected at the approximate beginning of Oxidant discharge and once every fifteen (15) minutes thereafter until the end of Oxidant discharge.

Monitoring for Time of Oxidant Addition and Time of Chlorine Addition shall be conducted during periods of oxidation, but no more frequently than once per week. A log shall be maintained of the oxidant addition occurrences.

Total Chromium, Total Zinc, and Priority Pollutants shall be monitored annually by grab sample.

Chloride and pH shall be monitored once per month by grab sample.

e. Justification of Limits

The Kentucky Administrative Regulations (KARs) cited below have been duly promulgated pursuant to the requirements of Chapter 224 of the Kentucky Revised Statutes (KRSs).

Concentration Limitations Versus Mass Based Limitations
Pursuant to 401 KAR 5:065, Sections 4 and 5, the requirements of 40 CFR Part 423 – Steam Electric Power Generating Point Source Category apply to this discharge. In accordance with 423.13(g) and 423.15(m) the permitting authority may allow the quantity of pollutant discharge to be expressed as a concentration limitation instead of a mass based limitation. The Division of Water has determined to apply the requirements of 40 CFR Part 423 in this manner.

Flow
The monitoring requirements for this parameter are consistent with the requirements of 401 KAR 5:065, Section 2(8).

Temperature
The limit for this parameter is consistent with the requirements of 401 KAR 10:031, Section 4, 401 KAR 10:029, Section 4, and 401 KAR 5:080, Section 1(2)(c)2.

Free Available Chlorine
The limits for this parameter are consistent with the requirements of 401 KAR 5:065, Sections 4 and 5. These limits are representative of the BAT and NSPS requirements for the discharge of these pollutants in cooling tower blowdown as specified in 40 CFR Part 423.13(d)(1) and 423.15(j)(1).

Time of Chlorine Addition
The limit for this parameter is consistent with the requirements of 401 KAR 5:065, Sections 4 and 5 and the NSPS requirements for the discharge of this pollutant in cooling tower blowdown as specified in 40 CFR Part 423.15(j)(2).

6. METHODOLOGY USED IN DETERMINING LIMITATIONS - continued

e. Justification of Limits – continued

Time of Oxidant Addition
The limit for this parameter is consistent with the requirements of 401 KAR 5:065, Sections 4 and 5 and 401 KAR 5:080, Section 1(2)(c)2. These limits are representative of the BPJ and NSPS requirements for the discharge of Free Available Chlorine and Total Residual Chlorine in cooling tower blowdown as specified in 40 CFR Part 423.15(j)(2). It is the Best Professional Judgment (BPJ) of the Division of Water that this requirement is also applicable to the addition of other oxidants.

Total Residual Chlorine
The removal of this parameter from the permit is consistent with the 401 KAR 5:080, Section 1(2)(c)2. Louisville Gas & Electric Company – Trimble County Station does not use chlorine as an oxidant, therefore it is the "Best Professional Judgment" (BPJ) of the Division of Water that this parameter be removed from the permit.

Total Residual Oxidants
The limit for this parameter is consistent with the requirements of 401 KAR 5:080, Section 1(2)(c) 2. The limit is representative of the Division of Water's "Best Professional Judgment" (BPJ) determination of the "Best Practicable Technology Currently Available" (BPT) and "Best Available Technology Economically Achievable" (BAT) requirements for these pollutants.

Total Chromium, Total Zinc, and Priority Pollutants
The limits for these parameters are consistent with the requirements of 401 KAR 5:065, Sections 4 and 5. These limits are representative of the BAT and NSPS requirements for the discharge of these pollutants in cooling tower blowdown as specified in 40 CFR Part 423.13(d)(1) and 423.15(j)(1).

Chloride
Tier 2: The monitoring requirements for this parameter are consistent with the requirements of 401 KAR 5:065, Section 2(8)(a) and 10:031, Section 4.

pH
The limits for this parameter are consistent with the requirements of 401 KAR 10:031, Section 4.

7. REPORTED DISCHARGE AND PROPOSED LIMITS

Description of Discharge - Outfall 003 – Sanitary wastewater (Internal Outfall).

Effluent Characteristics	Reported Discharge		Proposed Limits		Applicable Water Quality Criteria and/or Effluent Guidelines
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	

The sanitary wastewater is treated in an activated sludge package treatment plant prior to being discharged to the Combined Bottom and Fly Ash Treatment Basin (BAP). The BAP is operated as a no discharge system therefore no monitoring or effluent limitations are proposed. The treatment plant shall be operated by a Class One Certified Operator in accordance with the requirements of 401 KAR 5:010, Sections 2 and 8. The effluent quality from the treatment plant shall meet at a minimum the secondary treatment requirements specified in 401 KAR 5:045, Section 3 and shall be operated and maintained in accordance with the requirements of 401 KAR 5:065, Section 1(5).

8. METHODOLOGY USED IN DETERMINING LIMITATIONS

a. Serial Number

Outfall 003 (Internal Outfall) – Sanitary wastewater is treated in an activated sludge, aerobic digestion, and chlorination system prior to discharge to the Combined Bottom and Fly Ash Treatment Basin (BAP). The BAP is operated as a no discharge system.

b. Effluent Characteristics

None

c. Pertinent Factors

The design capacity of the activated sludge treatment plant is 43,000 gallons per day.

The discharge from the activated sludge treatment plant goes to the ash BAP which is operated as a no discharge system.

d. Monitoring Requirements

No compliance monitoring requirements are being proposed, however the permittee shall collect and analyze an adequate number of samples of the effluent from the plant to insure the effluent meets secondary treatment standards and is being properly operated.

e. Justification of Limits

The Kentucky Administrative Regulations (KARs) cited below have been duly promulgated pursuant to the requirements of Chapter 224 of the Kentucky Revised Statutes (KRSs).

Secondary Treatment Standards
The requirement to meet secondary treatment standards prior to discharge into the ash pond is consistent with 401 KAR 5:045, Section 3.

Class One Certified Operator
The requirement for the sanitary wastewater plant to be operated by a class one certified operator is consistent with the requirements of 401 KAR 5:010, Sections 2 and 8.

9. REPORTED DISCHARGE AND PROPOSED LIMITS

Description of Discharge - Outfall 004 (Internal Outfall) – Chemical precipitation and neutralization are provided to the metal cleaning wastewater prior to discharge to the Combined Bottom and Fly Ash Treatment Basin (BAP). The BAP is operated as a no discharge system.

Effluent Characteristics	Reported Discharge		Proposed Limits		Applicable Water Quality Criteria and/or Effluent Guidelines
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	

The metal cleaning wastewaters are pretreated prior to being discharged to the BAP. The BAP is operated as a no discharge system therefore no monitoring or effluent limitations are proposed. The wastes shall be adequately treated to meet the requirements of 401 KAR 5:065, Sections 4 and 5 (40 CFR Part 423 - Steam Electric Power Generating Point Source Category). The specific requirements include the “Best Practicable Technology Currently Available” (BPT – 423.12) and “Best Available Technology Economically Achievable” (BAT – 423.13) requirements.

10. METHODOLOGY USED IN DETERMINING LIMITATIONS

a. Serial Number

Outfall 004 (Internal Outfall) – Chemical precipitation and neutralization are provided to the metal cleaning wastewater prior to discharge to the BAP.

b. Effluent Characteristics

None

c. Pertinent Factors

The pretreated metal cleaning wastes are discharged to the Combined Bottom and Fly Ash Treatment Basin (BAP) which is operated as a no discharge system.

A summarization of the effluent guidelines, water quality standards, assumptions, and calculations can be found in Fact Sheet Attachment A – Regulatory Requirements.

d. Monitoring Requirements

No compliance monitoring requirements are being proposed, however the permittee shall insure the wastes are treated to the quality required by 40 CFR Part 423 - Steam Electric Power Generating Point Source Category. The specific requirements include the “Best Practicable Technology Currently Available” (BPT – 423.12) and “Best Available Technology Economically Achievable” (BAT – 423.13) requirements.

e. Justification of Limits

The Kentucky Administrative Regulations (KARs) cited below have been duly promulgated pursuant to the requirements of Chapter 224 of the Kentucky Revised Statutes (KRSs).

Metal Cleaning Wastes Requirement
This requirement is consistent with the requirements of 401 KAR 5:065, Sections 4 and 5 (40 CFR Part 423 - Steam Electric Power Generating Point Source Category. The specific requirements include the “Best Practicable Technology Currently Available” (BPT – 423.12) and “Best Available Technology Economically Achievable” (BAT – 423.13) requirements.).

11. REPORTED DISCHARGE AND PROPOSED LIMITS

Description of Discharge - Outfall 005 – Plant Intake.

Effluent Characteristics	Reported Discharge Monthly Average	Reported Discharge Daily Maximum	Proposed Limits Monthly Average	Proposed Limits Daily Maximum	Applicable Water Quality Criteria and/or Effluent Guidelines
Flow (MGD)	10.1	13.5	Report	Report	401 KAR 5:065, Section 2(8)
Temperature (^{o}F)	18.3(^{o}C)	22.6(^{o}C)	Report	Report	401 KAR 5:065, Section 2(8)
Hardness (as mg/l $CaCO_3$)	144	159	Report	Report	401 KAR 5:065, Section 2(8)
pH (Standard Units)	6.8	8.6	Report(min)	Report(max)	401 KAR 5:065, Section 2(8)

The data contained under the Reported Discharge columns are not from the renewal application but rather from the analysis of the DMR data that has been reported during the term of the current permit.

12. METHODOLOGY USED IN DETERMINING LIMITATIONS

a. Serial Number

Outfall 005 – Plant Intake

b. Effluent Characteristics

Flow	Temperature
Hardness	pH

c. Pertinent Factors

On September 8, 2004 Kentucky's revised water quality standards, 401 KAR 10:031 became effective.

d. Monitoring Requirements

Flow and Temperature shall be monitored continuously by recorder.

Hardness and pH shall be monitored once per week by grab sample

e. Justification of Limits

The Kentucky Administrative Regulations (KARs) cited below have been duly promulgated pursuant to the requirements of Chapter 224 of the Kentucky Revised Statutes (KRSs).

Flow, Temperature, Hardness, and pH
The monitoring requirements for these parameters are consistent with the requirements of 401 KAR 5:065, Section 2(8)(a).

13. REPORTED DISCHARGE AND PROPOSED LIMITS

Description of Discharge - Outfall 006 - This outfall previously received untreated uncontaminated stormwater runoff from wooded hillside northeast of plant. Outfall 006 will now be the internal outfall to 002 that receives excess process waters from the Gypsum Storage Basin, coal/limestone runoff, low volume wastes, and stormwater runoff into the basin (see Section 15 of this Fact Sheet). Outfall 007 - No treatment of uncontaminated stormwater runoff from wooded hillside east of plant and aesthetic berm south of plant. Outfall 008 - Sedimentation of stormwater runoff from borrow pit used to contain silt dredged from the Ohio River. Outfall 009 - No treatment of uncontaminated storm water runoff from southwest plant yard and aesthetic berm.

Effluent Characteristics	Reported Discharge		Proposed Limits		Applicable Water Quality Criteria and/or Effluent Guidelines
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	

The Division of Water has determined that implementation of Best Management Practices (BMPs) would be the most effective approach for controlling pollutants from these areas. This approach is consistent with the requirements of 401 KAR 5:065, Section 2(10).

14. METHODOLOGY USED IN DETERMINING LIMITATIONS

a. Serial Number

Outfall 006 - This outfall previously received untreated uncontaminated stormwater runoff from wooded hillside northeast of plant. Outfall 006 will now be the internal outfall to 002 that receives excess process waters from the Gypsum Storage Basin, coal/limestone runoff, low volume wastes, and stormwater runoff into the basin (see Section 15 of this Fact Sheet).

Outfall 007 - No treatment of uncontaminated stormwater runoff from wooded hillside east of plant and aesthetic berm south of plant.

Outfall 008 - Sedimentation of stormwater runoff from borrow pit used to contain silt dredged from the Ohio River.

Outfall 009 - No treatment of uncontaminated storm water runoff from southwest plant yard and aesthetic berm.

b. Effluent Characteristics

N/A

c. Pertinent Factors

The discharges from these outfalls are being removed from the permit. These outfalls will instead be managed through the facility's Best Management Practices Plan.

d. Monitoring Requirements

None

e. Justification of Limits

The Kentucky Administrative Regulations (KARs) cited below have been duly promulgated pursuant to the requirements of Chapter 224 of the Kentucky Revised Statutes (KRSs).

Best Management Practices (BMP) Plan
The requirement to address the runoff from these outfalls within the facility's BMP plan is consistent with the requirements of 401 KAR 5:065, Section 2(10).

15. REPORTED DISCHARGE AND PROPOSED LIMITS

Description of Discharge - Outfall 006 (Internal Outfall) – Outfall 006 will now describe the internal outfall to 002 that receives excess process waters from the new Gypsum Storage Basin, coal/limestone runoff, low volume wastes, and stormwater runoff into the basin.

Effluent Characteristics	Reported Discharge		Proposed Limits		Applicable Water Quality Criteria and/or Effluent Guidelines
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	
Flow (MGD)	N/R	N/R	Report	Report	401 KAR 5:065, Section 2(8)
Total Recoverable Metals (mg/l)	N/R	N/R	Report	Report	401 KAR 5:065, Section 2(8)
Total Suspended Solids (mg/l)	N/R	N/R	30	50	401 KAR 5:065, Sections 4 and 5 401 KAR 5:080, Section 1(2)(c)2
Oil & Grease (mg/l)	N/R	N/R	10	15	401 KAR 5:065, Sections 4 and 5 401 KAR 5:080, Section 1(2)(c)2

The data contained under the Reported Discharge columns are not from the renewal application, but rather from the analysis of the DMR data that has been reported during the term of the current permit.

The abbreviation N/A means Not Applicable.
The abbreviation N/R means Not Reported.

The term Total Recoverable Metals means Antimony, Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc.

16. METHODOLOGY USED IN DETERMINING LIMITATIONS

a. Serial Number

Outfall 006 (Internal Outfall) – Outfall 006 will now describe the internal outfall to 002 that receives excess process waters from the Gypsum Storage Basin, coal/limestone runoff, low volume wastes, and stormwater runoff into the basin.

b. Effluent Characteristics

Flow	Total Recoverable Metals
Total Suspended Solids	Oil & Grease

c. Pertinent Factors

On September 8, 2004 Kentucky's revised water quality standards, 401 KAR 10:031 became effective.

The Gypsum Storage Basin is subject to the requirements of 40 CFR Part 423 - Steam Electric Power Generating Point Source Category. The specific requirements include the "New Source Performance Standards" (NSPS – 423.15).

The flows contributing to the Gypsum Storage Basin will be sent to the Combined Bottom and Fly Ash Treatment Basin (BAP) until the gypsum basin is constructed. The BAP is operated as a no discharge system.

A summarization of the effluent guidelines, water quality standards, assumptions, and calculations can be found in Fact Sheet Attachment A – Regulatory Requirements.

d. Monitoring Requirements

Flow shall be measured continuously by recorder.

Total Recoverable Metals shall be monitored quarterly by grab sample. The results of the analyses shall be totaled and reported as a single concentration on the DMR. The laboratory bench sheets showing the results for each metal shall be attached to the DMR.

Total Suspended Solids and Oil & Grease shall be monitored once per week by grab sample.

e. Justification of Limits

The Kentucky Administrative Regulations (KARs) cited below have been duly promulgated pursuant to the requirements of Chapter 224 of the Kentucky Revised Statutes (KRSs).

Concentration Limitations Versus Mass Based Limitations

Pursuant to 401 KAR 5:065, Sections 4 and 5, the requirements of 40 CFR Part 423 – Steam Electric Power Generating Point Source Category apply to this discharge. In accordance with 423.13(g) and 423.15(m) the permitting authority may allow the quantity of pollutant discharge to be expressed as a concentration limitation instead of a mass based limitation. The Division of Water has determined to apply the requirements of 40 CFR Part 423 in this manner.

16. METHODOLOGY USED IN DETERMINING LIMITATIONS - continued

e. Justification of Limits – continued

Flow and Total Recoverable Metals
The monitoring requirements for these parameters are consistent with the requirements of 401 KAR 5:065, Section 2(8).

Total Suspended Solids and Oil & Grease
The limits for these parameters are consistent with the requirements of 401 KAR 5:065, Sections 4 and 5 and 401 KAR 5:080, Section 1(2)(c)2. These limits are representative of the BPJ and NSPS requirements for the discharge of these pollutants in low volume wastes as specified in 40 CFR Part 423.15(c) and stormwater runoff.

17. ANTIDEGRADATION

The conditions of 401 KAR 10:029, Section 1 have been satisfied by this permit action. This permit action involves the reissuance of a permit with a proposed expanded discharge. This proposed expanded discharge is to “impaired waters”. Therefore, a review under 401 KAR 10:030 Section 1 is not applicable.

18. PROPOSED COMPLIANCE SCHEDULE FOR ATTAINING EFFLUENT LIMITATIONS

The permittee shall comply with the effluent limitations and permit conditions by the effective date of the permit.

19. PROPOSED SPECIAL CONDITIONS WHICH WILL HAVE A SIGNIFICANT IMPACT ON THE DISCHARGE

Best Management Practices (BMP) Plan
Pursuant to 401 KAR 5:065, Section 2(10), a BMP requirement shall be included: to control or abate the discharge of pollutants from ancillary areas containing toxic or hazardous substances or those substances which could result in an environmental emergency; where numeric effluent limitations are infeasible; or to carry out the purposes and intent of KRS 224. The facility has several areas where support activities occur which have a potential of the discharge of such substances through storm water runoff or spillage. Some of these areas will drain to present wastewater treatment plants, others will not.

Cooling Water Additives, FIFRA, and Mollusk Control
The discharge of any product registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) in cooling water which has the potential to ultimately be released to the waters of the Commonwealth is prohibited, except Herbicides, unless specifically identified and authorized by the KPDES permit.

In the event the permittee desires to use any biocide or chemical not previously reported for mollusk control or other purpose, the permittee shall submit sufficient information to the Division of Water for review and establishment of appropriate control parameters. The required information shall be submitted a minimum of thirty (30) days prior to the commencement of use of said biocide or chemical and shall include:

1. Name and general composition of biocide or chemical,
2. Any and all aquatic organism toxicity data,
3. Quantities to be used,
4. Frequencies of use,
5. Proposed discharge concentrations, and
6. EPA registration number, if applicable.

19. PROPOSED SPECIAL CONDITIONS WHICH WILL HAVE A SIGNIFICANT IMPACT ON THE DISCHARGE – continued

Outfall Signage

As a member of ORSANCO (Ohio River Valley Sanitation Commission) the Commonwealth of Kentucky through the Division of Water implements a requirement that the permittee post a permanent marker at each discharge point to the Ohio River. It is the Best Professional Judgment of the Division of Water, 401 KAR 5:080, Section 1(2)(c)2, that all permittees post a marker at all discharge locations and/or monitoring points. The ORSANCO requirements for the marker specify it to be at least 2 feet by 2 feet in size and a minimum of 3 feet above ground level with the Permittee Name and KPDES permit and outfall numbers in 2 inch letters. For internal monitoring points the marker shall be of sufficient size to include the outfall number in 2 inch letters and is to be posted as near as possible to the actual sampling location. The permittee shall comply with these requirements within sixty (60) days of the effective date of this permit.

Polychlorinated Biphenyls

Pursuant to the requirements of 401 KAR 5:065, Section 4(3) (40 CFR Parts 423.12(b)(2) and 423.13(a)), there shall be no discharge, from any point source, of Polychlorinated Biphenyl compounds such as those commonly used in transformer fluids. The permittee shall implement this requirement as a specific section of the BMP plan developed for this station.

Selective Catalytic Reduction Devices or Systems (SCRs) and Nonselective Catalytic Reduction Devices or Systems (NSCRs)

In response to Clean Air Act amendments, the installation of these devices for NOx reduction may become necessary. Associated with the installation and operation of these units, an “ammonia slip” may occur resulting in the discharge of ammonia to the ash pond. The impact of such an occurrence on the performance of the ash pond and any eventual impact on the environment is not known. Therefore, should it become necessary to install these devices, the permittee shall develop and implement an Ammonia Monitoring Plan. The plan shall be submitted to the Division of Water within ninety (90) days of the determination that these devices will be installed and shall include a minimum influent and effluent monitoring of each unit on a monthly basis with submission of the data as quarterly reports.

Mixing Zone

Louisville Gas & Electric Company – Trimble County Station has requested a mixing zone in the vicinity of the proposed discharge for Temperature and Chloride. Pursuant to the requirements of 401 KAR 10:029, Section 4(6) an assigned mixing zone can not exceed 1/3 of the width of the receiving water body in a spatial direction. At the proposed point of discharge the width of the Ohio River is 1,923 feet therefore an assigned mixing zone for these pollutants can not exceed 641 feet in a spatial direction. In accordance with the requirements of 401 KAR 10:029, Section 4 (1) the mixing zone for Temperature shall have the following dimensions:

Linear Distance from Point of Discharge:	11.02 feet in any direction
Maximum Surface Area Involved:	95.33 square feet
Volume of Receiving Water	1,300 cfs (840 MGD)

The Division currently has insufficient information about Chloride levels in the effluent to perform a reasonable potential analysis and determine the physical dimensions of a mixing zone for this parameter. Tier 2 requires the permittee to sample for Chloride thereby providing the Division with the data necessary to analyze the discharge.

20. PERMIT DURATION

Five (5) years. This facility is in the Salt/Licking Basin Management Unit as per the Kentucky Watershed Management Framework.

21. PERMIT INFORMATION

The application, draft permit fact sheet, public notice, comments received, and additional information is available by writing the Division of Water at 200 Fair Oaks Lane, Frankfort, Kentucky 40601.

22. REFERENCES AND CITED DOCUMENTS

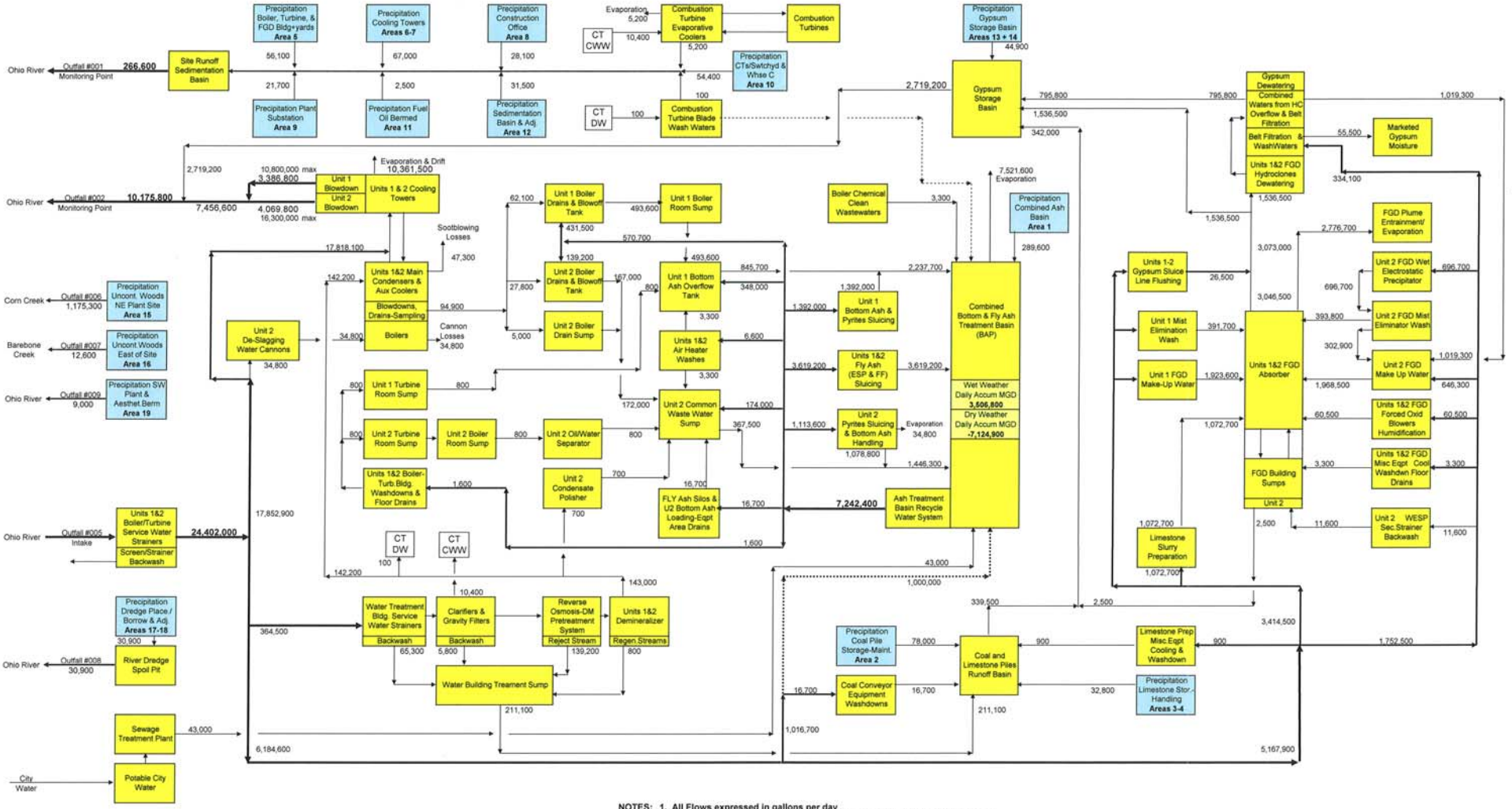
All material and documents referenced or cited in this fact sheet are a part of the permit information as described above and are readily available at the Division of Water Central Office. Information regarding these materials may be obtained from the person listed below.

23. CONTACT

For further information contact the individual identified on the Public Notice or the Permit Writer – Sara Beard at (502) 564-3410, extension 4925 or e-mail Sara.Beard@ky.gov.

24. PUBLIC NOTICE INFORMATION

Please refer to the attached Public Notice for details regarding the procedures for a final permit decision, deadline for comments and other information required by 401 KAR 5:075, Section 4(2)(e).



NOTES:
1. All Flows expressed in gallons per day
2. Diagram Flows Include PMAC Flows and Precipitiation Runoff Flows Added
3. PMAC (Peak Monthly Average Conditions) Process Flows Are Representative of Monthly Conditions Calculated as a Daily Average = 28 days Average Operational Flows + 1 Day Maximum Flows + 1 Day Maintenance Flows
4. Cooling Tower Temporary Maximum Blowdown Flows Included in PMAC Calculations but also Shown Here

TRIMBLE COUNTY GENERATING STATION - KDPES WATER BALANCE DIAGRAM PEAK MONTHLY AVERAGE CONDITIONS (PMAC) - PROCESS FLOWS PMAC CONDITIONS + AVERAGE RAINFALL RUNOFF FLOWS		PREPARED BY: RJM DATE: 5-19-2009 Revision 6	LG&E an E·ON company	TRIMBLE COUNTY GENERATING STATION WATER BALANCE DIAGRAM PMAC PROCESS CONDITIONS AND AVERAGE RAINFALL PERMIT NO. KY 0041971

KPDES

KENTUCKY POLLUTANT DISCHARGE ELIMINATION SYSTEM

PERMIT

PERMIT NO.: KY0041971
AI No.: 4054

AUTHORIZATION TO DISCHARGE UNDER THE KENTUCKY POLLUTANT DISCHARGE ELIMINATION SYSTEM

Pursuant to Authority in KRS 224,

Louisville Gas & Electric Company
P.O. Box 32010
Louisville, Kentucky 40232

is authorized to discharge from a facility located at

Louisville Gas & Electric Company
Trimble County Generating Station
487 Corn Creek Road
Bedford, Trimble County, Kentucky

to receiving waters named

Outfalls 001 and 002 discharge to the Ohio River at mile points 409.5 and 409.7, respectively.

Outfalls 003 and 004 discharge to the ash pond, which is operated as a no discharge system.

Outfall 005 is the plant intake from the Ohio River.

Outfall 006 is an internal outfall to 002.

in accordance with effluent limitations, monitoring requirements and other conditions set forth in PARTS I, II, III, IV, and V hereof. The permit consists of this cover sheet, and PART I 9 pages, PART II 1 page, PART III 1 page, and PART IV 3 pages.

This permit shall become effective on

This permit and the authorization to discharge shall expire at midnight,

Date Signed

Sandra L. Gruzesky, Director
Division of Water

A1. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the term of this permit, the permittee is authorized to discharge from Outfall serial number: 001 - Sedimentation of storm water from plant roof drains, gas turbine evaporative cooler blowdown, gas turbine blade washings and various plant yard areas.

Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	Monthly Avg.	Daily Max.	Measurement Frequency	Sample Type
Flow (MGD)	Report	Report	1/Quarter	Instantaneous
Total Suspended Solids (mg/l)	30	50	1/Quarter	Grab
Oil & Grease (mg/l)	10	15	1/Quarter	Grab
Hardness (mg/l)	Report	Report	1/Quarter	Grab
Total Recoverable Metals (mg/l)	Report	Report	1/Quarter	Grab

The pH of the effluent shall not be less than 6.0 standard units nor greater than 9.0 standard units, and shall be monitored 1/Quarter by grab sample.

There shall be no discharge of floating solids or visible foam or sheen in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location: nearest accessible point prior to discharge to or mixing with the receiving waters or wastestreams from other outfalls.

The term Total Recoverable Metals means those metals listed on Form C, Section V, Part C – Metals, Cyanide, and Total Phenols: Antimony, Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc.

Total Recoverable Metals shall be monitored once per quarter by grab sample. The results of the analyses shall be totaled and reported as a single concentration on the Discharge Monitoring Report (DMR). The laboratory bench sheets showing the results for each metal shall be attached to the DMR.

The abbreviation N/A means Not Applicable.

A2. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the term of this permit, the permittee is authorized to discharge from Outfall serial number: Outfall 002 – Combined untreated cooling tower blowdown from Unit 1 and Unit 2, and excess waters from the Gypsum Storage Basin (Tier 2: Internal Outfall 006). This wastewater is discharged through a multi-port diffuser. Cooling water is periodically brominated to control bio-fouling of condensers.

Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	Monthly Avg.	Daily Max.	Measurement Frequency	Sample Type
Flow (MGD)	Report	Report	Continuous	Calculated
Temperature (^{o}F)	95	100	Continuous	Recorder
Free Available Chlorine (mg/l)	0.2	0.5	1/Occurence	Multiple Grabs
Time of Chlorine Addition (min/unit/day)	N/A	120	1/Occurence	Multiple Grabs
Time of Oxidant Addition (min/unit/day)	N/A	120	1/Occurence	Multiple Grabs
Total Residual Chlorine (mg/l)	Removing from Permit			
Total Residual Oxidants (mg/l)	Report	0.20	1/Occurence	Multiple Grabs
Total Chromium (mg/l)	0.2	0.2	1/Year	Grab
Total Zinc (mg/l)	1.0	1.0	1/Year	Grab
Priority Pollutants* (mg/l)	N/A	NDA	1/Year	Grab
Chloride (mg/l)				
Tier 1	N/A	N/A	1/Month	Grab
Tier 2	Report	Report	1/Month	Grab

The pH of the effluent shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored 1/Month by Grab sample.

A2. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - continued

There shall be no discharge of floating solids or visible foam or sheen in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location: nearest accessible point after final treatment, but prior to actual discharge to or mixing with the receiving waters or wastestreams from other outfalls.

Total Residual Oxidants, Free Available Chlorine, Time of Chlorine Addition, and Time of Oxidant Addition shall be sampled by multiple grabs during periods of oxidation, but no more frequently than once per week. Multiple grabs shall consist of grab samples collected at the approximate beginning of Oxidant discharge and once every fifteen (15) minutes thereafter until the end of Oxidant discharge.

The term “daily maximum” as it applies to Free Available Chlorine and Total Residual Oxidants shall mean the average concentration during any individual chlorine (or other oxidizing agent) discharge period.

The abbreviation N/A means Not Applicable.

The abbreviation NDA means No Detectable Amount.

Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any one time.

The term Priority Pollutants means the 126 priority pollutants listed in 40 CFR Part 423 Appendix A. See Fact Sheet Attachment A – Regulatory Requirements.

* Compliance with the limitations for the 126 priority pollutants may be determined by engineering calculations which demonstrate that the regulated pollutants are not detectable in the final discharge by the analytical methods in 40 CFR part 136. Sampling of cooling tower blowdown must be taken at the nearest accessible point prior to discharge to or mixing with the receiving waters or wastestreams from other outfalls.

Tier 1: Limits are for current operations of Unit 1 as well as the addition of Unit 2 (scheduled to begin operation in 2010).

Tier 2: Limits are applicable after the Gypsum Storage Basin is complete. Discharge will consist of cooling tower blowdown from Units 1 and 2 as well as excess process waters from the Gypsum Storage Basin (Internal Outfall 006), coal/limestone runoff, low volume wastes, and stormwater runoff into the basin and stormwater runoff to the basin.

A3. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the term of this permit, the permittee is authorized to discharge from Outfall serial number: 003 - Sanitary wastewater is treated in an activated sludge, aerobic digestion, and chlorination system prior to discharge to the ash pond. The ash pond is operated as a no discharge system.

Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	Monthly Avg.	Daily Max.	Measurement Frequency	Sample Type

The sanitary wastewater is treated in an activated sludge package treatment plant prior to being discharged to the ash pond. The ash pond is operated as a no discharge system therefore no monitoring or effluent limitations are proposed. The treatment plant shall be operated by a Class One Certified Operator in accordance with the requirements of 401 KAR 5:010, Sections 2 and 8. The effluent quality from the treatment plant shall meet at a minimum the secondary treatment requirements specified in 401 KAR 5:045, Section 3 and shall be operated and maintained in accordance with the requirements of 401 KAR 5:065, Section 1(5).

A4. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the term of this permit, the permittee is authorized to discharge from Outfall serial number: 004 (Internal Outfall) – Chemical precipitation and neutralization are provided to the metal cleaning wastewater prior to discharge to the ash pond. The ash pond is operated as a no discharge system.

Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	Monthly Avg.	Daily Max.	Measurement Frequency	Sample Type

The metal cleaning wastewaters are pretreated prior to being discharged to the ash pond. The ash pond is operated as a no discharge system therefore no monitoring or effluent limitations are proposed. The wastes shall be adequately treated to meet the requirements of 401 KAR 5:065, Sections 4 and 5 (40 CFR Part 423 - Steam Electric Power Generating Point Source Category). The specific requirements include the “Best Practicable Technology Currently Available” (BPT – 423.12) and “Best Available Technology Economically Achievable” (BAT – 423.13) requirements.

A5. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the term of this permit, the permittee is authorized to discharge from Outfall serial number: 005 – Plant Intake.

Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	Monthly Avg.	Daily Max.	Measurement Frequency	Sample Type
Flow (MGD)	Report	Report	Continuous	Recorder
Temperature (^{o}F)	Report	Report	Continuous	Recorder
Hardness (as mg/l $CaCO_3$)	Report	Report	1/Week	Grab

The pH of the effluent shall be monitored 1/Week by Grab sample.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location: nearest accessible point after final treatment, but prior to actual discharge to or mixing with other wastewaters.

A6. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the term of this permit, the permittee is authorized to discharge from Outfall serial number: Outfall 006 - This outfall previously received untreated uncontaminated stormwater runoff from wooded hillside northeast of plant. Outfall 006 will now describe the internal outfall to 002 that receives excess process waters from the Gypsum Storage Basin, coal/limestone runoff, low volume wastes, and stormwater runoff into the basin (see Section 15 of this Fact Sheet). Outfall 007 - No treatment of uncontaminated stormwater runoff from wooded hillside east of plant and aesthetic berm south of plant. Outfall 008 - Sedimentation of stormwater runoff from borrow pit used to contain silt dredged from the Ohio River. Outfall 009 - No treatment of uncontaminated storm water runoff from southwest plant yard and aesthetic berm.

Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	Monthly Avg.	Daily Max.	Measurement Frequency	Sample Type

The Division of Water has determined that implementation of Best Management Practices (BMPs) would be the most effective approach for controlling pollutants from these areas. This approach is consistent with the requirements of 401 KAR 5:065, Section 2(10).

A7. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the term of this permit, the permittee is authorized to discharge from Outfall serial number: Outfall 006 (Internal Outfall) – Outfall 006 will now describe the internal outfall to 002 that receives excess process waters from the Gypsum Storage Basin, coal/limestone runoff, low volume wastes, and stormwater runoff into the basin.

Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS	
	Monthly Avg.	Daily Max.	Measurement Frequency	Sample Type
Flow (MGD)	Report	Report	Continuous	Recorder
Total Recoverable Metals (mg/l)	Report	Report	1/Quarter	Grab
Total Suspended Solids (mg/l)	30	50	1/Week	Grab
Oil & Grease (mg/l)	10	15	1/Week	Grab

The abbreviation N/A means Not Applicable.

The term Total Recoverable Metals means Antimony, Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc.

B. Schedule of Compliance

The permittee shall comply with the effluent limitations and permit conditions by the effective of the permit.

C. Cooling Water Additives, FIFRA, and Mollusk Control

The discharge of any product registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) in cooling water which has the potential to ultimately be released to the waters of the Commonwealth is prohibited, except Herbicides, unless specifically identified and authorized by the KPDES permit.

In the event the permittee desires to use any biocide or chemical not previously reported for mollusk control or other purpose, the permittee shall submit sufficient information to the Division of Water for review and establishment of appropriate control parameters. The required information shall be submitted a minimum of thirty (30) days prior to the commencement of use of said biocide or chemical and shall include:

1. Name and general composition of biocide or chemical,
2. Any and all aquatic organism toxicity data,
3. Quantities to be used,
4. Frequencies of use,
5. Proposed discharge concentrations, and
6. EPA registration number, if applicable.

D. Polychlorinated Biphenyls

Pursuant to the requirements of 401 KAR 5:065, Section 4(4) (40 CFR Parts 423.12(b)(2) and 423.13(a)), there shall be no discharge from any point source, of Polychlorinated Biphenyl compounds such as those commonly used in transformer fluids. The permittee shall implement this requirement as a specific section of the BMP plan developed for this station.

E. Selective Catalytic Reduction Devices or Systems (SCRs) and Nonselective Catalytic Reduction Devices or Systems (NSCRs)

In response to Clean Air Act amendments, the installation of these devices for NOx reduction may become necessary. Associated with the installation and operation of these units, an “ammonia slip” may occur resulting in the discharge of ammonia to the ash pond. The impact of such an occurrence on the performance of the ash pond and any eventual impact on the environment is not known. Therefore, should it become necessary to install these devices, the permittee shall develop and implement an Ammonia Monitoring Plan. The plan shall be submitted to the Division of Water within ninety (90) days of the determination that these devices will be installed and shall include a minimum influent and effluent monitoring of each unit on a monthly basis with submission of the data as quarterly reports.

PART II - STANDARD CONDITIONS FOR KPDES PERMIT

This permit has been issued under the provisions of KRS Chapter 224 and regulations promulgated pursuant thereto. Issuance of this permit does not relieve the permittee from the responsibility of obtaining any other permits or licenses required by this Cabinet and other state, federal, and local agencies.

It is the responsibility of the permittee to demonstrate compliance with permit parameter limitations by utilization of sufficiently sensitive analytical methods.

The permittee is also advised that all KPDES permit conditions in KPDES Regulation 401 KAR 5:065, Section 1 will apply to all discharges authorized by this permit.

PART III – OTHER REQUIREMENTS

A. Reporting of Monitoring Results

Monitoring results obtained during each monitoring period must be reported on a preprinted Discharge Monitoring Report (DMR) Form that will be mailed to you. The completed DMR for each monitoring period must be sent to the Division of Water at the address listed below (with a copy to the appropriate Regional Office) postmarked no later than the 28th day of the month following the monitoring period for which monitoring results were obtained.

Division of Water
Florence Regional Office
8020 Veterans Memorial Drive,
Suite 110
Frankfort, Kentucky 40601
ATTN: Supervisor

Energy & Environment Cabinet
Dept. for Environmental Protection
Division of Water/Surface Water Permits Branch
200 Fair Oaks Lane
Frankfort, Kentucky 40601

B. Reopener Clause

This permit shall be modified, or alternatively revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under 401 KAR 5:050 through 5:085, if the effluent standard or limitation so issued or approved:

1. Contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or

2. Controls any pollutant not limited in the permit.

The permit as modified or reissued under this paragraph shall also contain any other requirements of KRS Chapter 224 when applicable.

C. Outfall Signage

The permittee shall post a permanent marker at all discharge locations and/or monitoring points. The marker shall be at least 2 feet by 2 feet in size and a minimum of 3 feet above ground level with the Permittee Name and KPDES permit and outfall numbers in 2 inch letters. For internal monitoring points the marker shall be of sufficient size to include the outfall number in 2 inch letters and shall be posted as near as possible to the actual sampling location. The permittee shall comply with these requirements within sixty (60) days of the effective date of this permit.

D Mixing Zone

The assigned mixing zone for Temperature at Outfall 002 shall have the following dimensions:

Linear Distance from Point of Discharge:	11.02 feet in any direction
Maximum Surface Area Involved:	95.33 square feet
Volume of Receiving Water	1,300 cfs (840 MGD)

PART IV - BEST MANAGEMENT PRACTICES

SECTION A. GENERAL CONDITIONS

1. Applicability

These conditions apply to all permittees who use, manufacture, store, handle or discharge any pollutant listed as toxic under Section 307(a)(1) of the Clean Water Act, oil, as defined in Section 311(a)(1) of the Act, and any pollutant listed as hazardous under Section 311 of the Act and who have ancillary manufacturing operations which could result in (1) the release of a hazardous substance, pollutant, or contaminant in a reportable quantity, or (2) an environmental emergency, as defined in KRS 224.01-400, as amended, or any regulation promulgated pursuant thereto (hereinafter, the "BMP pollutants"). These operations include material storage areas; plant site runoff; in-plant transfer, process and material handling areas; loading and unloading operations, and sludge and waste disposal areas.

2. BMP Plan

The permittee shall develop and implement a Best Management Practices (BMP) plan consistent with 401 KAR 5:065, Section 2(10) pursuant to KRS 224.70-110, which prevents, or minimizes the potential for, the release of "BMP pollutants" from ancillary activities through plant site runoff; spillage or leaks, sludge or waste disposal; or drainage from raw material storage. A Best Management Practices (BMP) plan will be prepared by the permittee unless the permittee can demonstrate through the submission of a BMP outline that the elements and intent of the BMP have been fulfilled through the use of existing plans such as the Spill Prevention Control and Countermeasure (SPCC) plans, contingency plans, and other applicable documents.

3. Implementation

The plan shall be modified to implement the requirements of Section B - Specific Conditions as soon as possible but not later than one (1) year from the effective date of the permit.

4. General Requirements

The BMP plan shall:

a. Be documented in narrative form, and shall include any necessary plot plans, drawings or maps.

b. Establish specific objectives for the control of toxic and hazardous pollutants.

(1) Each facility component or system shall be examined for its potential for causing a release of "BMP pollutants" due to equipment failure, improper operation, natural phenomena such as rain or snowfall, etc.

(2) Where experience indicates a reasonable potential for equipment failure (e.g., a tank overflow or leakage), natural condition (e.g., precipitation), or other circumstances which could result in a release of "BMP pollutants", the plan should include a prediction of the direction, rate of flow and total quantity of the pollutants which could be released from the facility as result of each condition or circumstance.

c. Establish specific best management practices to meet the objectives identified under Paragraph b of this section, addressing each component or system capable of causing a release of "BMP pollutants."

d. Include any special conditions established in part B of this section.

e. Be reviewed by plant engineering staff and the plant manager.

5. Specific Requirements

The plan shall be consistent with the general guidance contained in the publication entitled "NPDES Best Management Practices Guidance Document" and shall include the following baseline BMP's as a minimum.

a. BMP Committee
b. Reporting of BMP Incidents
c. Risk Identification and Assessment
d. Employee Training
e. Inspections and Records
f. Preventive Maintenance
g. Good Housekeeping
h. Materials Compatibility
i. Security
j. Materials Inventory

6. SPCC Plans

The BMP plan may reflect requirements for Spill Prevention Control and Countermeasure (SPCC) plans under Section 311 of the Act and 40 CFR Part 151, and may incorporate any part of such plans into the BMP plan by reference.

7. Hazardous Waste Management

The permittee shall assure the proper management of solids and hazardous waste in accordance with the regulations promulgated under the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1978 (RCRA) (40 U.S.C. 6901 et seq.) Management practices required under RCRA regulations shall be referenced in the BMP plan.

8. Documentation

The permittee shall maintain a description of the BMP plan at the facility and shall make the plan available to the Director within one (1) year after the effective date of the permit. Copies of the BMP plan shall be sent to:

Division of Water
Florence Regional Office
8020 Veterans Memorial Drive,
Suite 110
Frankfort, Kentucky 40601
ATTN: Supervisor

Energy & Environment Cabinet
Dept. for Environmental Protection
Division of Water/Surface Water Permits Branch
200 Fair Oaks Lane
Frankfort, Kentucky 40601

9. BMP Plan Modification

The permittee shall amend the BMP plan whenever there is a change in the facility or change in the operation of the facility which materially increases the potential for the ancillary activities to result in the release of "BMP pollutants."

10. Modification for Ineffectiveness

If the BMP plan proves to be ineffective in achieving the general objective of preventing the release of "BMP pollutants" then the specific objectives and requirements under Paragraphs b and c of Section 4, the permit and/or the BMP plan shall be subject to modification to incorporate revised BMP requirements. If at any time following the issuance of this permit, the BMP plan is found to be inadequate pursuant to a state or federal site inspection or plan review, the plan shall be modified to incorporate such changes necessary to resolve the concerns.

SECTION B. SPECIFIC CONDITIONS

1. Periodically Discharged Wastewaters Not Specifically Covered By Effluent Guidelines

Louisville Gas & Electric Company – Trimble County Station shall include in this BMP Plan procedures and controls necessary for the handling of periodically discharged wastewaters such as intake screen backwash, meter calibration, fire protection, hydrostatic testing water, water associated with demolition projects, etc.

FACT SHEET ATTACHMENT A - REGULATORY REQUIREMENTS

EFFLUENT GUIDELINES

PART 423 - STEAM ELECTRIC POWER GENERATING POINT SOURCE CATEGORY

Section 423.12 - Best Practicable Control Technology Currently Available (BPT)

(b)(1) The pH of all discharges, except once-through cooling water, shall be within the range of 6.0 to 9.0 standard units.

(b)(2) There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.

(b)(3) The quantity of pollutants discharged from low volume waste sources shall not exceed the quantity determined by multiplying the flow of low volume waste sources times the concentration listed in the following table.

Low volume wastes sources means, taken collectively as if from one (1) source, wastewater from all sources except those for which specific limitations are otherwise established. Included but not limited to wet scrubber air pollution control systems, ion exchange water treatment system, water treatment evaporator blowdown, laboratory and sampling streams, boiler blowdown, floor drains, cooling tower basin cleaning wastes, and recirculating house service water systems. Sanitary and air conditioning wastes are not included.

Pollutant or Pollutant Characteristic	Maximum for Any 1 Day (mg/l)	Average of Daily Values for 30 Consecutive Days Shall Not Exceed (mg/l)
Total Suspended Solids	100.0	30.0
Oil & Grease	20.0	15.0

(b)(4) The quantity of pollutants discharged in fly ash and bottom ash transport waters shall not exceed the quantity determined by multiplying the flow of fly ash and bottom ash transport waters times the concentration listed in the following table.

Pollutant or Pollutant Characteristic	Maximum for Any 1 Day (mg/l)	Average of Daily Values for 30 Consecutive Days Shall Not Exceed (mg/l)
Total Suspended Solids	100.0	30.0
Oil & Grease	20.0	15.0

(b)(5) The quantity of pollutants discharged in metal cleaning wastes shall not exceed the quantity determined by multiplying the flow of metal cleaning wastes times the concentration listed in the following table.

Pollutant or Pollutant Characteristic	Maximum for Any 1 Day (mg/l)	Average of Daily Values for 30 Consecutive Days Shall Not Exceed (mg/l)
Total Suspended Solids	100.0	30.0
Oil & Grease	20.0	15.0
Copper, Total	1.0	1.0
Iron, Total	1.0	1.0

Section 423.12 - Best Practicable Control Technology Currently Available (BPT) - continued

(b)(6) The quantity of pollutants discharged in once-through cooling water shall not exceed the quantity determined by multiplying the flow of once-through cooling water times the concentration listed in the following table.

Pollutant or Pollutant Characteristic	Maximum Concentration (mg/l)	Average Concentration (mg/l)
Free Available Chlorine	0.5	0.2

(b)(7) The quantity of pollutants discharged in cooling tower blowdown shall not exceed the quantity determined by multiplying the flow of cooling tower blowdown times the concentration listed in the following table.

Pollutant or Pollutant Characteristic	Maximum Concentration (mg/l)	Average Concentration (mg/l)
Free Available Chlorine	0.5	0.2

The term average concentration as it relates to chlorine discharge means the average of analyses made over a single period of chlorine release which does not exceed two (2) hours.

(b)(8) Neither Free Available Chlorine nor Total Residual Chlorine may be discharged from any unit for more than two (2) hours in any one day and not more than one (1) unit in any plant may discharge Free Available Chlorine or Total Residual Chlorine at any one time.

(b)(9) The following effluent limitations shall apply to the point source discharges of coal pile runoff.

Pollutant or Pollutant Characteristic	Maximum Concentration for Any Time (mg/l)
Total Suspended Solids	50

Section 423.13 - Best Available Technology Economically Achievable (BAT)

(a) There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.

(b)(1) For any plant with a total rated electric generating capacity of 25 or more megawatts, the quantity of pollutants discharged in once-through cooling water from each discharge point shall not exceed the quantity determined by multiplying the flow of the once-through cooling water from each discharge point times the concentration listed in the following table.

Pollutant or Pollutant Characteristic	Maximum Concentration for Any Time (mg/l)
Total Residual Chlorine	0.2

Section 423.13 - Best Available Technology Economically Achievable (BAT) - continued

(b)(2) Total Residual Chlorine may not be discharged from any single generating unit for more than two (2) hours per day.

(d)(1) The quantity of pollutants discharged in cooling tower blowdown shall not exceed the quantity determined by multiplying the flow of cooling tower blowdown times the concentration listed in the following table.

Pollutant or Pollutant Characteristic	Maximum Concentration (mg/l)	Average Concentration (mg/l)
Free Available Chlorine	0.5	0.2

Pollutant or Pollutant Characteristic	Maximum for Any 1 Day (mg/l)	Average of Daily Values for 30 Consecutive Days Shall Not Exceed (mg/l)
The 126 priority pollutants contained in chemicals added for cooling tower maintenance except:	No detectable amount	No detectable amount
Chromium, Total	0.2	0.2
Zinc, Total	1.0	1.0

(d)(2) Neither Free Available Chlorine nor Total Residual Chlorine may be discharged from any unit for more than two (2) hours in any one (1) day and not more than one (1) unit in any plant may discharge Free Available Chlorine or Total Residual Chlorine at any one time.

(d)(3) At the permitting authority's discretion, instead of the monitoring specified in 40 CFR 122.11(b) compliance with the limitations for the 126 priority pollutants in paragraph (d)(1) of this section may be determined by engineering calculations which demonstrate that the regulated pollutants are not detectable in the final discharge by the analytical methods in 40 CFR part 136.

(e) The quantity of pollutants discharged in chemical metal cleaning wastes shall not exceed the quantity determined by multiplying the flow of the chemical metal cleaning wastes times the concentration listed in the following table.

Pollutant or Pollutant Characteristic	Maximum for Any 1 Day (mg/l)	Average of Daily Values for 30 Consecutive Days Shall Not Exceed (mg/l)
Copper, Total	1.0	1.0
Iron, Total	1.0	1.0

Section 423.15 – New Source Performance Standards (NSPS)

Any new source subject to this subpart must achieve the following new source performance standards:

(a) The pH of all discharges, except once through cooling water, shall be within the range of 6.0–9.0.

(b) There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.

Section 423.15 – New Source Performance Standards (NSPS) - continued

(c) The quantity of pollutants discharged from low volume waste sources shall not exceed the quantity determined by multiplying the flow of low volume waste sources times the concentration listed in the following table:

Pollutant or Pollutant Characteristic	Maximum for Any 1 Day (mg/l)	Average of Daily Values for 30 Consecutive Days Shall Not Exceed (mg/l)
Total Suspended Solids	100.0	30.0
Oil & Grease	20.0	15.0

(d) The quantity of pollutants discharged in chemical metal cleaning wastes shall not exceed the quantity determined by multiplying the flow of chemical metal cleaning wastes times the concentration listed in the following table:

Pollutant or Pollutant Characteristic	Maximum for Any 1 Day (mg/l)	Average of Daily Values for 30 Consecutive Days Shall Not Exceed (mg/l)
Total Suspended Solids	100.0	30.0
Oil & Grease	20.0	15.0
Copper, Total	1.0	1.0
Iron, Total	1.0	1.0

(e) [Reserved—Nonchemical Metal Cleaning Wastes].

(f) The quantity of pollutants discharged in bottom ash transport water shall not exceed the quantity determined by multiplying the flow of the bottom ash transport water times the concentration listed in the following table:

Pollutant or Pollutant Characteristic	Maximum for Any 1 Day (mg/l)	Average of Daily Values for 30 Consecutive Days Shall Not Exceed (mg/l)
Total Suspended Solids	100.0	30.0
Oil & Grease	20.0	15.0

(g) There shall be no discharge of wastewater pollutants from fly ash transport water.

(h)(1) For any plant with a total rated electric generating capacity of 25 or more megawatts, the quantity of pollutants discharged in once through cooling water from each discharge point shall not exceed the quantity determined by multiplying the flow of once through cooling water from each discharge point times the concentration listed in the following table:

Pollutant or Pollutant Characteristic	Maximum Concentration for Any Time (mg/l)
Total Residual Chlorine	0.2

(2) Total residual chlorine may not be discharged from any single generating unit for more than two hours per day unless the discharger demonstrates to the permitting authority that discharge for more than two hours is required for macroinvertebrate control. Simultaneous multi-unit chlorination is permitted.

(i)(1) For any plant with a total rated generating capacity of less than 25 megawatts, the quantity of pollutants discharged in once through cooling water shall not exceed the quantity determined by multiplying the flow of once through cooling water sources times the concentration listed in the following table:

Section 423.15 – New Source Performance Standards (NSPS) - continued

Pollutant or Pollutant Characteristic	Maximum Concentration (mg/l)	Average Concentration (mg/l)
Free Available Chlorine	0.5	0.2

(2) Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any one time unless the utility can demonstrate to the Regional Administrator or State, if the State has NPDES permit issuing authority, that the units in a particular location cannot operate at or below this level of chlorination.

(j)(1) The quantity of pollutants discharged in cooling tower blowdown shall not exceed the quantity determined by multiplying the flow of cooling tower blowdown times the concentration listed below:

Pollutant or Pollutant Characteristic	Maximum Concentration (mg/l)	Average Concentration (mg/l)
Free Available Chlorine	0.5	0.2

Pollutant or Pollutant Characteristic	Maximum for Any 1 Day (mg/l)	Average of Daily Values for 30 Consecutive Days Shall Not Exceed (mg/l)
The 126 priority pollutants contained in chemicals added for cooling tower maintenance except:	No detectable amount	No detectable amount
Chromium, Total	0.2	0.2
Zinc, Total	1.0	1.0

(2) Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any one time unless the utility can demonstrate to the Regional Administrator or State, if the State has NPDES permit issuing authority, that the units in a particular location cannot operate at or below this level of chlorination.

(3) At the permitting authority's discretion, instead of the monitoring in 40 CFR 122.11(b), compliance with the limitations for the 126 priority pollutants in paragraph (j)(1) of this section may be determined by engineering calculations which demonstrate that the regulated pollutants are not detectable in the final discharge by the analytical methods in 40 CFR part 136.

(k) Subject to the provisions of §423.15(l), the quantity or quality of pollutants or pollutant parameters discharged in coal pile runoff shall not exceed the limitations specified below:

Pollutant or Pollutant Characteristic	Maximum Concentration for Any Time (mg/l)
Total Suspended Solids	50

Section 423.15 – New Source Performance Standards (NSPS) - continued

(l) Any untreated overflow from facilities designed, constructed, and operated to treat the coal pile runoff which results from a 10 year, 24 hour rainfall event shall not be subject to the limitations in §423.15(k).

(m) At the permitting authority's discretion, the quantity of pollutant allowed to be discharged may be expressed as a concentration limitation instead of the mass based limitation specified in paragraphs (c) through (j) of this section. Concentration limits shall be based on the concentrations specified in this section.

(n) In the event that waste streams from various sources are combined for treatment or discharge, the quantity of each pollutant or pollutant property controlled in paragraphs (a) through (m) of this section attributable to each controlled waste source shall not exceed the specified limitation for that waste source.

WARM WATER AQUATIC HABITAT CRITERIA

401 KAR 5:031, SECTION 6 (TABLE 1)

Allowable instream concentrations of pollutants:

Pollutant or Pollutant Characteristic	Acute Criteria (mg/l)	Chronic Criteria (mg/l)
Total Residual Chlorine	1200	600

BEST PROFESSIONAL JUDGEMENT

401 KAR 5:080, SECTION 1(2)(c)2

For Coal Pile Runoff

Pollutant or Pollutant Characteristic	Maximum Concentration (mg/l)	Average Concentration (mg/l)
Total Suspended Solids	N/A	30
Oil & Grease	5.0	5.0

For Plant Area Storm Water Runoff

Pollutant or Pollutant Characteristic	Maximum Concentration (mg/l)	Average Concentration (mg/l)
Total Suspended Solids	50	30
Oil & Grease	15.0	10.0

401 KAR 5:080, SECTION 1(2)(c)2 - continued

To calculate the flows for precipitation-based discharges, the following formula will be used.

Q = CIAF

Where		1-Day Flow	30-Day Flow
Q	is flow (in MGD)		
C	is the coefficient of runoff		
I	is the rainfall (in inches)	10-yr, 24-hr event	Annual Ave. Rainfall
A	is the area (in acres)		
F	is the units conversion factor	0.027152400	0.000074390

Due to the treatment plant being a co-treatment system, the development of flow-weighted limitations is required to insure compliance with the effluent guidelines. To calculate the limits for each parameter, the following formulas are used.

$$\text{Monthly Average} = \frac{\sum Q_{30} \times F_{30}}{Q_{30}} \qquad \text{Daily Maximum} = \frac{\sum Q_1 \times F_1}{Q_1}$$

Where Q_{30} is the 30-day or average flow of each component wastestream
Q_1 is the maximum flow of each component wastestream
F_{30} is the average factor applied to each component wastestream
F_1 is the maximum factor applied to each component wastestream

APPENDIX A TO PART 403—126 PRIORITY POLLUTANTS		
001 Acenaphthene	044 Methylene chloride (dichloromethane)	088 Vinyl chloride (chloroethylene)
002 Acrolein	045 Methyl chloride (dichloromethane)	089 Aldrin
003 Acrylonitrile	046 Methyl bromide (bromomethane)	090 Dieldrin
004 Benzene	047 Bromoform (tribromomethane)	091 Chlordane (technical mixture and metabolites)
005 Benzidine	048 Dichlorobromomethane	092 4,4-DDT
006 Carbon tetrachloride (tetrachloromethane)	051 Chlorodibromomethane	093 4,4-DDE (p,p-DDX)
007 Chlorobenzene	052 Hexachlorobutadiene	094 4,4-DDD (p,p-TDE)
008 1,2,4-trichlorobenzene	053 Hexachloromyclopentadiene	095 Alpha-endosulfan
009 Hexachlorobenzene	054 Isophorone	096 Beta-endosulfan
010 1,2-dichloroethane	055 Naphthalene	097 Endosulfan sulfate
011 1,1,1-trichloreothane	056 Nitrobenzene	098 Endrin
012 Hexachloroethane	057 2-nitrophenol	099 Endrin aldehyde
013 1,1-dichloroethane	058 4-nitrophenol	100 Heptachlor
014 1,1,2-trichloroethane	059 2,4-dinitrophenol	101 Heptachlor epoxide (BHC-hexachlorocyclohexane)
015 1,1,2,2-tetrachloroethane	060 4,6-dinitro-o-cresol	102 Alpha-BHC
016 Chloroethane	061 N-nitrosodimethylamine	103 Beta-BHC
018 Bis(2-chloroethyl) ether	062 N-nitrosodiphenylamine	104 Gamma-BHC (lindane)
019 2-chloroethyl vinyl ether (mixed)	063 N-nitrosodi-n-propylamin	105 Delta-BHC (PCB-polychlorinated biphenyls)
020 2-chloronaphthalene	064 Pentachlorophenol	106 PCB—1242 (Arochlor 1242)
021 2,4, 6-trichlorophenol	065 Phenol	107 PCB—1254 (Arochlor 1254)
022 Parachlorometa cresol	066 Bis(2-ethylhexyl) phthalate	108 PCB—1221 (Arochlor 1221)
023 Chloroform (trichloromethane)	067 Butyl benzyl phthalate	109 PCB—1232 (Arochlor 1232)
024 2-chlorophenol	068 Di-N-Butyl Phthalate	110 PCB—1248 (Arochlor 1248)
025 1,2-dichlorobenzene	069 Di-n-octyl phthalate	111 PCB—1260 (Arochlor 1260)
026 1,3-dichlorobenzene	070 Diethyl Phthalate	112 PCB—1016 (Arochlor 1016)
027 1,4-dichlorobenzene	071 Dimethyl phthalate	113 Toxaphene
028 3,3-dichlorobenzidine	072 1,2-benzanthracene (benzo(a)anthracene)	114 Antimony
029 1,1-dichloroethylene	073 Benzo(a)pyrene (3,4-benzo-pyrene)	115 Arsenic
030 1,2-trans-dichloroethylene	074 3,4-Benzofluoranthene (benzo(b)fluoranthene)	116 Asbestos
031 2,4-dichlorophenol	075 11,12-benzofluoranthene (benzo(b)fluoranthene)	117 Beryllium
032 1,2-dichloropropane	076 Chrysene	118 Cadmium
033 1,2-dichloropropylene (1,3-dichloropropene)	077 Acenaphthylene	119 Chromium
034 2,4-dimethylphenol	078 Anthracene	120 Copper
035 2,4-dinitrotoluene	079 1,12-benzoperylene (benzo(ghi) perylene)	121 Cyanide, Total
036 2,6-dinitrotoluene	080 Fluorene	122 Lead
037 1,2-diphenylhydrazine	081 Phenanthrene	123 Mercury
038 Ethylbenzene	082 1,2,5,6-dibenzanthracene (dibenzo(,h) anthracene)	124 Nickel
039 Fluoranthene	083 Indeno (,1,2,3-cd) pyrene (2,3-o-pheynylene pyrene)	125 Selenium
040 4-chlorophenyl phenyl ether	084 Pyrene	126 Silver
041 4-bromophenyl phenyl ether	085 Tetrachloroethylene	127 Thallium
042 Bis(2-chloroisopropyl) ether	086 Toluene	126 Silver
043 Bis(2-chloroethoxy) methane	087 Trichloroethylene	128 Zinc
		129 2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD)

CORMIX2 PREDICTION FILE:

```
                    CORMIX MIXING ZONE EXPERT SYSTEM
         Subsystem CORMIX2:  Multiport Diffuser Discharges
                       CORMIX Version 5.0GT
                    HYDRO2 Version 5.0.0.0 March 2007
------------------------------------------------------------------------------
------------------------------------------------------------------------------
CASE DESCRIPTION
 Site name/label:   LG&E Trimble County
 Design case:       Temperature Mixing Zone - 100 F
 FILE NAME:         C:\....0_TEST\MyFiles\Trimble Co LG&E - Temperature.prd
Time stamp:        Tue Aug  4 16:21:38 2009

ENVIRONMENT PARAMETERS (metric units)
 Bounded section
 BS    =    586.13  AS    =   2036.64  QA    =    295.83  ICHREG= 1
 HA    =      3.47  HD    =      2.44
 UA    =     0.145  F     =     0.032 USTAR =0.9242E-02
 UW    =     2.000 UWSTAR=0.2198E-02
 Uniform density environment
 STRCND=  U         RHOAM =  995.3715

DIFFUSER DISCHARGE PARAMETERS (metric units)
 Diffuser type:     DITYPE= unidirectional_perpendicular
 BANK  =  LEFT      DISTB =     29.37  YB1   =     23.50  YB2   =     35.25
 LD    =     12.19  NOPEN =    3       SPAC  =      6.10
 D0    =     0.356 A0    =     0.099 H0    =      0.18  SUB0  =      2.26
 Nozzle/port arrangement:   unidirectional_without_fanning
 GAMMA =     74.50  THETA =     15.00  SIGMA =      0.00  BETA  =     74.50
 U0    =     1.495 Q0    =     0.446       =0.4458E+00
 RHO0  =  993.0346  DRHO0 =0.2337E+01  GP0   =0.2302E-01
 C0    =0.6900E+01  CUNITS=  deg.C
 IPOLL =  3         KS    =0.0000E+00  KD    =0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 q0    =0.3657E-01  m0    =0.5469E-01  j0    =0.8419E-03  SIGNJ0=      1.0
 Associated 2-d length scales (meters)
 lQ=B  =      0.024 lM    =      6.12  lm    =      2.59
 lmp   =  99999.00  lbp   =  99999.00  la    =  99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 Q0    =0.4458E+00  M0    =0.6667E+00  J0    =0.1026E-01
 Associated 3-d length scales (meters)
 LQ    =      0.32  LM    =      7.28  Lm    =      5.62  Lb    =      3.35
                                       Lmp   =  99999.00  Lbp   =  99999.00

NON-DIMENSIONAL PARAMETERS
 FR0   =     63.03  FRD0  =     16.53  R     =     10.30  PL    =     16.
 (slot)             (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:
 Properties of riser group with  1 ports/nozzles each:
 U0    =     1.495 D0    =     0.356 A0    =     0.099 THETA =     15.00
 FR0   =     63.03  FRD0  =     16.53  R     =     10.30
 (slot)             (riser group)
```

CORMIX2 PREDICTION FILE:

```
FLOW CLASSIFICATION
 22222222222222222222222222222222222222
 2  Flow class (CORMIX2)      =    MU2    2
 2  Applicable layer depth HS =     2.44  2
 22222222222222222222222222222222222222

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS
 C0    =0.6900E+01  CUNITS=  deg.C
 NTOX  =  0
 NSTD  =  1         CSTD  =0.8000E+00
 REGMZ =  0
 XINT  =  10972.80  XMAX  =  10972.80

X-Y-Z COORDINATE SYSTEM:
    ORIGIN is located at the bottom and the diffuser mid-point:
        29.37 m  from the LEFT  bank/shore.
    X-axis points downstream, Y-axis points to left, Z-axis points upward.
NSTEP = 800 display intervals per module

NOTE on dilution/concentration values for this HEATED DISCHARGE (IPOLL=3):
   S  = hydrodynamic dilutions, include buoyancy (heat) loss effects, but
        provided plume has surface contact
   C  = corresponding temperature values (always in "degC"!),
        include heat loss, if any
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
BEGIN MOD201: DIFFUSER DISCHARGE MODULE

 Due to complex near-field motions:  EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

 Profile definitions:
   BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)

       X        Y       Z        S       C       BV       BH
     0.00     0.00    0.18     1.0 0.690E+01   0.02     6.10

END OF MOD201: DIFFUSER DISCHARGE MODULE
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

 In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY
  MIXED over the entire layer depth (HS =    2.44m).
   Full mixing is achieved after a plume distance of about five
   layer depths from the diffuser.
```

CORMIX2 PREDICTION FILE:

```
 Profile definitions:
   BV = layer depth (vertically mixed)
   BH = top-hat half-width, in horizontal plane normal to trajectory
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)

       X        Y       Z        S       C       BV       BH
     0.00     0.00    0.18     1.0 0.690E+01   0.02     6.10
     0.01     0.00    0.18     1.4 0.506E+01   0.02     6.09
     0.02     0.00    0.18     1.5 0.456E+01   0.02     6.08
.
.
.
     3.34     0.00    0.75     8.6 0.802E+00   1.34     4.83
     3.35     0.00    0.75     8.6 0.801E+00   1.34     4.83
     3.35     0.00    0.75     8.6 0.801E+00   1.34     4.83

** WATER QUALITY STANDARD OR CCC HAS BEEN FOUND **
 The pollutant concentration in the plume falls below water quality standard
   or CCC value of 0.800E+00 in the current prediction interval.
 This is the spatial extent of concentrations exceeding the water quality
   standard or CCC value.

     3.36     0.00    0.75     8.6 0.800E+00   1.34     4.83
     3.37     0.00    0.75     8.6 0.799E+00   1.35     4.83
     3.38     0.00    0.75     8.6 0.798E+00   1.35     4.83
.
.
.
     6.08     0.00    1.22    11.3 0.613E+00   2.43     4.62
     6.09     0.00    1.22    11.3 0.612E+00   2.44     4.62
     6.10     0.00    1.22    11.3 0.612E+00   2.44     4.62
 Cumulative travel time =          22.3601 sec
   Plume centerline may exhibit slight discontinuities in transition
     to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER
------------------------------------------------------------------------------
------------------------------------------------------------------------------
BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

 Phase 1: Vertically mixed, Phase 2: Re-stratified

------------------------------------------------------------------------------
 Phase 2: The flow has RESTRATIFIED at the beginning of this zone.

 This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW
------------------------------------------------------------------------------
** End of NEAR-FIELD REGION (NFR) **
```

CORMIX2 PREDICTION FILE:

```
 The initial plume WIDTH values in the next far-field module will be
  CORRECTED by a factor  1.53 to conserve the mass flux in the far-field!
 The correction factor is quite large because of the small ambient velocity
   relative to the strong mixing characteristics of the discharge!
   This indicates localized RECIRCULATION REGIONS and internal hydraulic JUMPS.
   Width predictions show discontinuities, dilution values should be acceptable.
------------------------------------------------------------------------------
BEGIN MOD241: BUOYANT AMBIENT SPREADING

 Profile definitions:
   BV = top-hat thickness, measured vertically
   BH = top-hat half-width, measured horizontally in y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic average (bulk) dilution
   C  = average (bulk) concentration (includes reaction effects, if any)

 Plume Stage 1 (not bank attached):
       X        Y       Z        S       C       BV       BH      ZU      ZL
    6.10     0.00    2.44    11.3 0.612E+00   2.44     7.08    2.44    0.00
    6.22     0.00    2.44    11.3 0.611E+00   2.43     7.13    2.44    0.01
    6.35     0.00    2.44    11.3 0.610E+00   2.42     7.17    2.44    0.02
.
.
.
  108.96     0.00    2.44    17.2 0.402E+00   0.90    29.34    2.44    1.54
  109.08     0.00    2.44    17.2 0.402E+00   0.90    29.36    2.44    1.54
  109.21     0.00    2.44    17.2 0.401E+00   0.90    29.38    2.44    1.54
 Cumulative travel time =         731.2078 sec

------------------------------------------------------------------------------
 Plume is ATTACHED to LEFT  bank/shore.
   Plume width is now determined from LEFT  bank/shore.

 Plume Stage 2 (bank attached):
       X        Y       Z        S       C       BV       BH      ZU      ZL
  109.21    29.37    2.44    17.2 0.401E+00   0.90    58.76    2.44    1.54
  110.65    29.37    2.44    17.2 0.400E+00   0.90    59.00    2.44    1.54
  112.08    29.37    2.44    17.3 0.399E+00   0.89    59.23    2.44    1.54
.
.
.
 1254.03    29.37    2.44   154.3 0.447E-01   2.44   189.21    2.44    0.00
 1255.47    29.37    2.44   154.6 0.446E-01   2.44   189.34    2.44    0.00
 1256.90    29.37    2.44   154.9 0.445E-01   2.44   189.47    2.44    0.00
 Cumulative travel time =        8620.6914 sec

END OF MOD241: BUOYANT AMBIENT SPREADING
------------------------------------------------------------------------------
 Due to the attachment or proximity of the plume tothe bottom, the bottom
   coordinate for the FAR-FIELD differs from the ambient depth, ZFB = 0 m.
 In a subsequent analysis set "depth at discharge" equal to "ambient depth".
------------------------------------------------------------------------------
BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
```

CORMIX2 PREDICTION FILE:

```
  Vertical diffusivity (initial value)   = 0.453E-02 m^2/s
  Horizontal diffusivity (initial value) = 0.566E-02 m^2/s

 The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

 Profile definitions:
   BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
      = or equal to layer depth, if fully mixed
   BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
        measured horizontally in Y-direction
   ZU = upper plume boundary (Z-coordinate)
   ZL = lower plume boundary (Z-coordinate)
   S  = hydrodynamic centerline dilution
   C  = centerline concentration (includes reaction effects, if any)

 Plume Stage 2 (bank attached):
       X        Y       Z        S       C        BV       BH      ZU      ZL
   1256.90    29.37    2.44   154.9 0.445E-01   2.44   189.47    2.44    0.00
   1269.05    29.37    2.44   154.9 0.445E-01   2.44   189.47    2.44    0.00
   1281.19    29.37    2.44   154.9 0.445E-01   2.44   189.48    2.44    0.00
.
.
.
  10948.47    29.37    2.44   157.5 0.438E-01   2.44   192.57    2.44    0.00
  10960.61    29.37    2.44   157.5 0.438E-01   2.44   192.57    2.44    0.00
  10972.76    29.37    2.44   157.5 0.438E-01   2.44   192.58    2.44    0.00
 Cumulative travel time =       75409.9141 sec

 Simulation limit based on maximum specified distance =  10972.80 m.
   This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
CORMIX2: Multiport Diffuser Discharges       End of Prediction File
22222222222222222222222222222222222222222222222222222222222222222222222222222
```

CORMIX SESSION REPORT:

```
                    CORMIX MIXING ZONE EXPERT SYSTEM
                        CORMIX Version 5.0GT
                     HYDRO2:Version  March,2007
SITE NAME/LABEL:                LG&E Trimble County
  DESIGN CASE:                  Temperature Mixing Zone - 100 F
  FILE NAME:                    C:\Program Files\CORMIX 5.0 TEST\MyFiles\Trimble Co LG&E
- Temperature.prd
  Using subsystem CORMIX2:     Multiport Diffuser Discharges
  Start of session:             08/04/2009--16:21:38
*******************************************************************************
SUMMARY OF INPUT DATA:
-------------------------------------------------------------------------------
AMBIENT PARAMETERS:
  Cross-section                         = bounded
  Width                          BS     = 586.13 m
  Channel regularity             ICHREG = 1
  Ambient flowrate               QA     = 295.83 m^3/s
  Average depth                  HA     = 3.47 m
  Depth at discharge             HD     = 2.44 m
  Ambient velocity               UA     = 0.1453 m/s
  Darcy-Weisbach friction factor F      = 0.0324
    Calculated from Manning's n         = 0.025
  Wind velocity                  UW     = 2 m/s
  Stratification Type            STRCND = U
  Surface temperature                   = 30.90 degC
  Bottom temperature                    = 30.90 degC
  Calculated FRESH-WATER DENSITY values:
  Surface density                RHOAS  = 995.3715 kg/m^3
  Bottom density                 RHOAB  = 995.3715 kg/m^3
-------------------------------------------------------------------------------
DISCHARGE PARAMETERS:           Submerged Multiport Diffuser Discharge
  Diffuser type                 DITYPE = unidirectional perpendicular
  Diffuser length               LD     = 12.19 m
  Nearest bank                         = left
  Diffuser endpoints            YB1    = 23.50 m;    YB2 = 35.25 m
  Number of openings            NOPEN  = 3
  Number of Risers              NRISER = 3
  Ports/Nozzles per Riser       NPPERR  = 1
  Spacing between risers/openings SPAC   = 6.10 m
  Port/Nozzle diameter          D0     = 0.3557 m
    with contraction ratio              = 1
  Equivalent slot width         B0     = 0.0245 m
  Total area of openings        TA0    = 0.2981 m^2
  Discharge velocity            U0     = 1.50 m/s
  Total discharge flowrate      Q0     = 0.445829 m^3/s
  Discharge port height         H0     = 0.18 m
  Nozzle arrangement            BETYPE = unidirectional without fanning
  Diffuser alignment angle      GAMMA  = 74.5 deg
  Vertical discharge angle      THETA  = 15 deg
  Actual Vertical discharge angle THEAC  = 15 deg
  Horizontal discharge angle    SIGMA  = 0 deg
  Relative orientation angle    BETA   = 74.5 deg
  Discharge temperature (freshwater)    = 37.80 degC
  Corresponding density         RHO0   = 993.0346 kg/m^3
  Density difference            DRHO   = 2.3369 kg/m^3
  Buoyant acceleration          GP0    = 0.023 m/s^2
```

CORMIX SESSION REPORT:

```
  Discharge concentration         C0     = 6.9 deg.C
  Surface heat exchange coeff.    KS     = 0 m/s
  Coefficient of decay            KD     = 0 /s
-------------------------------------------------------------------------------
FLUX VARIABLES PER UNIT DIFFUSER LENGTH:
  Discharge (volume flux)         q0     = 0.036567 m^2/s
  Momentum flux                   m0     = 0.054686 m^3/s^2
  Buoyancy flux                   j0     = 0.000842 m^3/s^3
-------------------------------------------------------------------------------
DISCHARGE/ENVIRONMENT LENGTH SCALES:
  LQ  = 0.02 m          Lm  = 2.59 m          LM  = 6.12 m
  lm' = 99999 m          Lb' = 99999 m          La  = 99999 m
  (These refer to the actual discharge/environment length scales.)
-------------------------------------------------------------------------------
NON-DIMENSIONAL PARAMETERS:
Slot Froude number              FR0    = 63.03
  Port/nozzle Froude number       FRD0   = 16.53
  Velocity ratio                  R      = 10.30
-------------------------------------------------------------------------------
MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:
  Toxic discharge                         = no
  Water quality standard specified        = yes
  Water quality standard          CSTD   = 0.8 deg.C
  Regulatory mixing zone                  = no
  Region of interest                      = 10972.80 m downstream
*******************************************************************************
HYDRODYNAMIC CLASSIFICATION:
  *-------------------------*
  | FLOW CLASS   = MU2 |
  *-------------------------*
  This flow configuration applies to a layer corresponding to the full water
  depth at the discharge site.
  Applicable layer depth = water depth = 2.44 m
*******************************************************************************
MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

-------------------------------------------------------------------------------
X-Y-Z Coordinate system:
  Origin is located at the bottom below the port center:
    29.37 m from the left bank/shore.
  Number of display steps NSTEP = 800 per module.
-------------------------------------------------------------------------------
NEAR-FIELD REGION (NFR) CONDITIONS :
Note: The NFR is the zone of strong initial mixing.  It has no regulatory
  implication.  However, this information may be useful for the discharge
  designer because the mixing in the NFR is usually sensitive to the
  discharge design conditions.
  Pollutant concentration at NFR edge  c = 0.6121 deg.C
  Dilution at edge of NFR              s = 11.3
  NFR Location:                        x = 6.10 m
    (centerline coordinates)           y = 0 m
                                       z = 2.44 m
  NFR plume dimensions:  half-width (bh) = 4.62 m
                          thickness (bv) = 2.44 m
Cumulative travel time:       22.3601 sec.
-------------------------------------------------------------------------------
```

CORMIX SESSION REPORT:

```
Buoyancy assessment:
  The effluent density is less than the surrounding ambient water
  density at the discharge level.
  Therefore, the effluent is POSITIVELY BUOYANT and will tend to rise towards
  the surface.
------------------------------------------------------------------------------
Near-field instability behavior:
  The diffuser flow will experience instabilities with full vertical mixing
  in the near-field.
  There may be benthic impact of high pollutant concentrations.
------------------------------------------------------------------------------
FAR-FIELD MIXING SUMMARY:
  Plume is vertically fully mixed WITHIN NEAR-FIELD (or a fraction thereof),
  but RE-STRATIFIES LATER.
  Plume becomes vertically fully mixed again at 1256.90 m downstream.
------------------------------------------------------------------------------
PLUME BANK CONTACT SUMMARY:
  Plume in bounded section contacts one bank only at 109.21 m downstream.
************************ TOXIC DILUTION ZONE SUMMARY ************************
No TDZ was specified for this simulation.
********************** REGULATORY MIXING ZONE SUMMARY ***********************
No RMZ has been specified.
However:
The ambient water quality standard was encountered at the following
  plume position:
  Water quality standard                = 0.8  deg.C
  Corresponding dilution              s = 8.6
  Plume location:                     x = 3.36 m
    (centerline coordinates)          y = 0 m
                                      z = 0.75 m
  Plume dimensions:      half-width (bh) = 4.83 m
                          thickness (bv) = 1.34 m
********************** FINAL DESIGN ADVICE AND COMMENTS **********************
CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent
  the actual three-dimensional diffuser geometry.  Thus, it approximates
  the details of the merging process of the individual jets from each
  port/nozzle.
In the present design, the spacing between adjacent ports/nozzles
  (or riser assemblies) is of the order of, or less than, the local
  water depth so that the slot diffuser approximation holds well.

Nevertheless, if this is a final design, the user is advised to use a
  final CORMIX1 (single port discharge) analysis, with discharge data
  for an individual diffuser jet/plume, in order to compare to
  the present near-field prediction.
------------------------------------------------------------------------------
REMINDER:  The user must take note that HYDRODYNAMIC MODELING by any known
  technique is NOT AN EXACT SCIENCE.
Extensive comparison with field and laboratory data has shown that the
  CORMIX predictions on dilutions and concentrations (with associated
  plume geometries) are reliable for the majority of cases and are accurate
  to within about +-50% (standard deviation).
As a further safeguard, CORMIX will not give predictions whenever it judges
  the design configuration as highly complex and uncertain for prediction.
```